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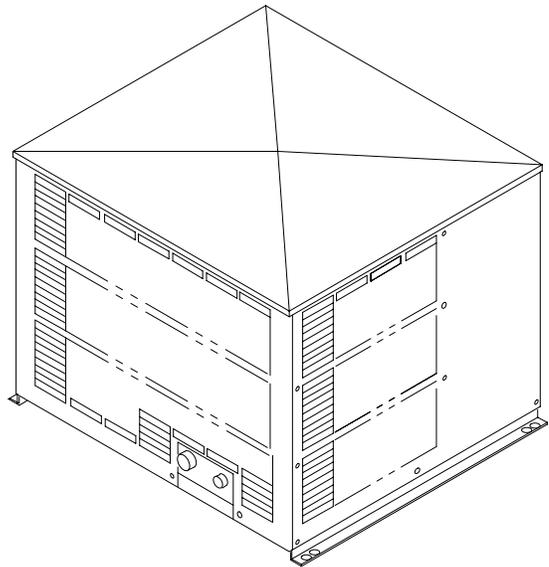
Installation/Service Manual

REMOTE CONDENSING UNIT

UNIT PART NUMBERS:

416117-0001 (R-404A Refrigerant)

496117-0001 (R-404A Refrigerant)



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THIS DOCUMENT CONTAINS IMPORTANT INFORMATION

This Manual must be read and understood before installing or operating this equipment

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SAFETY INFORMATION

Recognize Safety Information

This is the safety-alert symbol. When you see this symbol on our machine or in this manual, be alert to the potentiality of personal injury.

Follow recommended precautions and safe operating practices.



Understand Signal Words

A signal word - **DANGER**, **WARNING**, OR **CAUTION** is used with the safety-alert symbol. **DANGER** identifies the most serious hazards.

Safety signs with signal word **DANGER** or **WARNING** are typically near specific hazards.

General precautions are listed on **CAUTION** safety signs. **CAUTION** also calls attention to safety messages in this manual.



Follow Safety Instructions

Carefully read all safety messages in this manual and on your machine safety signs. Keep safety signs in good condition. Replace missing or damaged safety signs. Learn how to operate the machine and how to use the controls properly. Do not let anyone operate the machine without instructions. Keep your machine in proper working condition. Unauthorized modifications to the machine may impair function and/or safety and affect the machine life.

CO₂ (Carbon Dioxide) Warning

CO₂ Displaces Oxygen. Strict Attention *must* be observed in the prevention of CO₂ (carbon dioxide) gas leaks in the entire CO₂ system. If a CO₂ gas leak is suspected, particularly in a small area, *immediately* ventilate the contaminated area before attempting to repair the leak. Personnel exposed to high concentration of CO₂ gas will experience tremors which are followed rapidly by loss of consciousness and suffocation.

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INSTALLATION

TO THE USER OF THIS MANUAL

This manual is a guide for installing and maintaining this equipment. Refer to Table of Contents for page location of detailed information pertaining to questions that may arise during installation, service and maintenance, or troubleshooting this equipment.

This Unit must be installed and serviced by a qualified Service Person. This Unit contains no user serviceable parts.

DESCRIPTION

The Remote Condensing Unit consists basically of a refrigeration compressor, a receiver tank, a fan cooled condenser coil, a head pressure control, and a strainer/dryer mounted on an enclosed platform. The Remote Condensing Coil Unit (see Figure 1) is designed to be used with any Evaporator Assembly with a rated temperature range of -10°F to -32°F. The Evaporator Assembly is connected by refrigeration lines and is refrigerated by the Remote Condensing Unit.

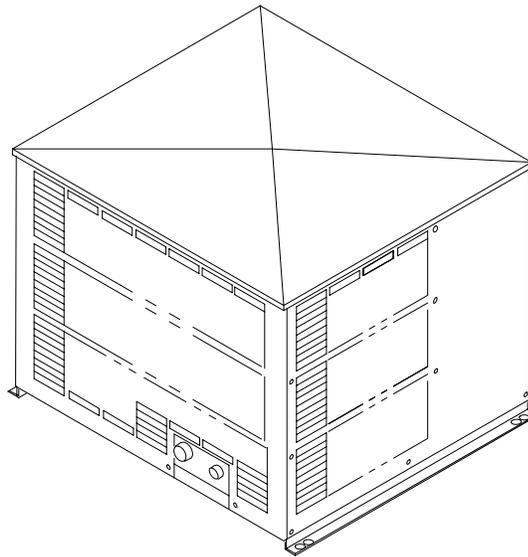


FIGURE 1. REMOTE CONDENSING UNIT

Table 1. Design Data	
REMOTE CONDENSING UNIT	
Unit Part No.	
230V, 60 HZ Unit (R-404A Refrigerant)	4161170001
230V, 50 HZ Unit (R-404A Refrigerant)	4961170001
Overall Dimensions:	
Height	22-1/4 inches
Width	28-1/2 inches
Depth	25-3/4 inches
Shipping Weight (approx)	
	290 Pounds

Table 1. Design Data (cont'd)

Ambient Operating Temperature	-20°F to 120°F
Refrigeration Requirements:	
Refrigeration Type and Charge	See Unit Nameplate
Electrical Requirements:	
Operating Voltage	See Unit Nameplate
Current Draw	See Unit Nameplate

UNPACKING AND INSPECTION

NOTE: The Remote Condensing Unit was thoroughly inspected before leaving the factory and the carrier has accepted and signed for it. Any damage or irregularities should be noted at time of delivery (or not later than 15 days from date of delivery) and immediately reported to the delivering carrier. Request a written inspection report from Claims Inspector to substantiate any necessary claim. File claim with the delivering carrier, not with Cornelius Inc.

1. Unpack Remote Condensing Unit. Remove all shipping tape and packing materials.
2. Inspect and make sure Remote Condensing Unit is in good condition as instructed in preceding **NOTE**.

INSTALLATION

SELECTING LOCATION

Locate the Remote Condensing Unit so the following requirements are satisfied:

1. The Remote Condensing Unit must be installed in a location which will allow shortest possible refrigeration lines route (not to exceed 50-feet in length) from Condensing Unit to the Evaporator Assembly. *The Condensing Unit must not be installed more than 10-feet below the Evaporator Assembly Dispenser.*



DANGER: To avoid possible fatal electrical shock or serious injury to the operator, it is ***highly recommended*** that a GFI (ground fault circuit interrupt) be installed in the electrical circuit for the 60 Hz Units. It ***is required*** that an ELCB (earth leakage circuit breaker) be installed in the electrical circuit for the 50 Hz Units.

2. Close to a properly grounded 208/230 VAC 60HZ or 220/240 VAC 50Hz single-phase electrical circuit with a 30-amp minimum-rated disconnect switch (not provided) fused at 25-amps (“slow-blow”) or power circuit connected through an equivalent HACR circuit breaker must be available to the Unit. Use No. 8 AWG copper wire, or larger, depending upon line length, in suitable conduit or BX sheath. **POWER CIRCUIT MUST BE MADE UP OF COPPER CONDUCTORS AND ALL WIRING MUST CONFORM TO NATIONAL AND LOCAL CODES. MAKE SURE UNIT IS PROPERLY GROUNDED.**
3. An extreme warm climate installation may require extra caution in Remote Condensing Unit location. Avoid hot sunny locations and seek shaded area if possible. If Remote Condensing Unit is to be installed on the rooftop, the use of a structure to shade the Unit from direct sun exposure and/or a platform extending Unit an additional 18-inches above the roof is highly recommended and will improve performance. Ample space (24 inches on all sides and 48 inches above Unit) must be provided for proper air circulation through the Unit and also access for service and maintenance. **DO NOT BLOCK AIR CIRCULATION THROUGH THE UNIT.**

- If the Remote Condensing Unit is installed on the rooftop, the Unit must be installed in a level position and must be anchored with adequate fastening devices.

INSTALLING REMOTE CONDENSING UNIT

(see Figures 2, 3, and 4)

- Install Remote Condensing Unit meeting requirements of **SELECTING LOCATION**. The Unit must be installed in a level position and must be anchored with adequate fastening devices.

NOTE: The following Refrigeration Lines Kits are recommended to connect the Remote Condensing Unit to the Evaporator Assembly. Contact Cornelius if refrigeration lines exceed 50 feet in length.

Part No.	Description
308900025	Refrigeration Lines Kit, 25-ft. long 90° (insulated 3/8 O.D. Liquid and 5/8 O.D. Discharge)
308900050	Refrigeration Lines Kit, 50-ft. long 90° (insulated 3/8 O.D. Liquid and 5/8 O.D. Discharge)

- Route refrigeration lines from Remote Condensing Unit to the Evaporator Assembly.
- Connect ends of refrigeration lines to Remote Condensing Unit refrigeration connectors.
- Remove four screws securing Remote Condensing Unit top cover, then remove cover for access to electrical control box.
- Remove one screw securing electrical control box cover, then remove cover.



WARNING: The Remote Condensing Unit *must* be electrically grounded to avoid possible fatal electrical shock or serious injury to the operator. A green ground wire is provided inside electrical control box to connect power circuit ground wire which electrically grounds the Unit.

- Connect 208/230 VAC 60Hz or 220/240 VAC 50 Hz Single-Phase electrical power circuit (meeting requirements of SELECTING LOCATION) to L₁ and L₂ (N) terminals on contactor inside the Unit electrical control box as shown in FIGURE NO TAG. MAKE SURE POWER CIRCUIT GREEN GROUND WIRE IS INSTALLED UNDER GREEN GROUND SCREW INSIDE ELECTRICAL CONTROL BOX TO PROPERLY GROUND THE UNIT. POWER CIRCUIT MUST BE MADE UP OF COPPER CONDUCTORS AND ALL WIRING MUST CONFORM TO NATIONAL AND LOCAL ELECTRICAL CODES.
- A 24 VAC power circuit, which must conform to national and local electrical codes, must be routed and connected between the Evaporator Assembly Temperature Control and the Remote Condensing Unit. Purpose of the 24VAC power control circuit is to allow the Evaporator Assembly Temperature Control to control "ON" and "OFF" operation of the Remote Condensing Unit. Route and connect 24VAC power control circuit between the Evaporator Assembly and the Remote Condensing Unit as follows:
 - Route 24 VAC power control circuit electrical wires through hole in end panel to inside of the Remote Condensing Unit.
 - Connect 24 VAC power control circuit electrical wires to labeled 24 V grey and red wires hanging out of the electrical control box.
 - Install electrical control box cover and secure with screw.
 - Route 24VAC power control circuit from Remote Condensing Unit to the Evaporator Assembly location.
 - Refer to manual provided with the Evaporator Assembly for instructions to connect 24VAC power circuit to Evaporator Assembly Temperature Control.

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SERVICE AND MAINTENANCE

This section describes service and maintenance procedures to be performed on the Unit.



WARNING: Disconnect electrical power to Remote Condensing Unit to prevent personal injury before attempting any internal maintenance. Only qualified personnel should service internal components or electrical wiring.

PERIODIC INSPECTION

Make sure Remote Condensing Unit Condenser Coil is free from debris. Restricting air through the condenser coil will decrease the refrigeration systems cooling efficiency.

LUBRICATION

The Remote Condensing Unit condenser fan motor must be lubricated once every six months with S.A.E. 20W oil. DO NOT OVER OIL.

CLEANING CONDENSER COIL



CAUTION: Remote Condensing Unit is equipped with a condenser coil that must be cleaned every 30 days. Allowing condenser coil to become clogged will cause refrigeration system to overheat which will automatically shut refrigeration system down. After condenser coil has been cleaned, high-pressure cutout sensing switch (located inside the Remote Condensing Unit electrical control box) will automatically reset to restart the refrigeration system. OPERATING IN THIS MANNER FOR PROLONGED PERIODS OF TIME COULD RESULT IN COMPRESSOR FAILURE.

The Remote Condensing Unit condenser coil must be cleaned every 30 days. Circulating air, required to cool the coil, is drawn in through the coil and is exhausted out through grilles on end and back of the Unit. Clean condenser coil as follows:

1. Disconnect electrical power from Evaporator Assembly 24VAC Temperature Control.
2. Disconnect electrical power to Remote Condensing Unit at disconnect switch.
3. Remove four screws securing top cover on Remote Condensing Unit, then remove cover.
4. Clean condenser coil using vacuum cleaner, whisk broom, or a soft-bristle brush to remove any debris from coil.
5. Make sure fan blade is not out of balance, is not bent, and is not striking any surface during rotation.
6. If the Remote Condensing Unit has been installed on the rooftop check and make sure roof area immediately surrounding the Remote Condensing Unit is free and clear of any debris that may have collected such as leaves, paper, trash, etc.
7. Install top cover on Remote Condensing Unit and secure with four screws.
8. Restore electrical power to Remote Condensing Unit at disconnect switch.
9. Restore electrical power to Evaporator Assembly 24VAC Temperature Control.

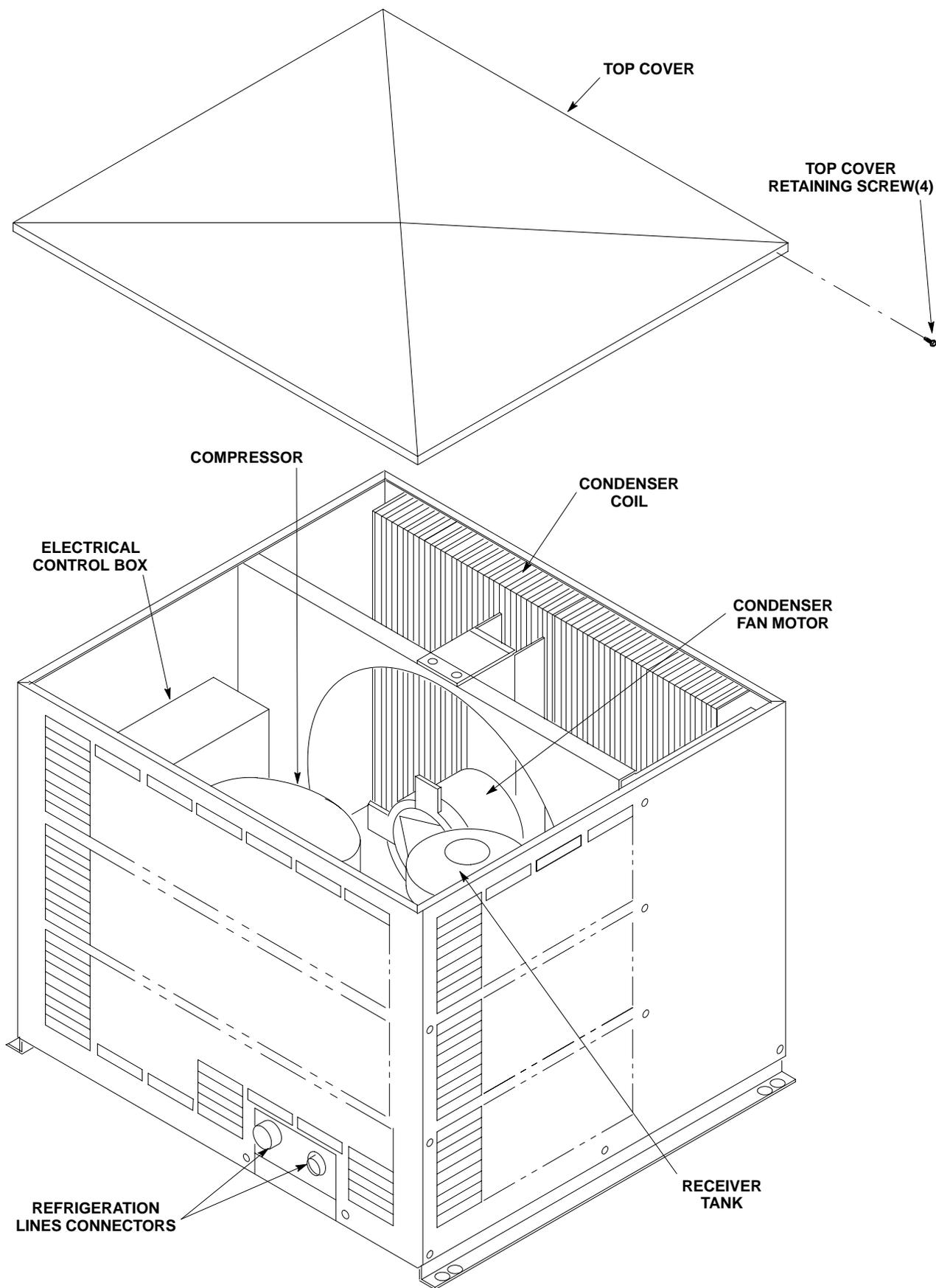


FIGURE 2. PARTS IDENTIFICATION

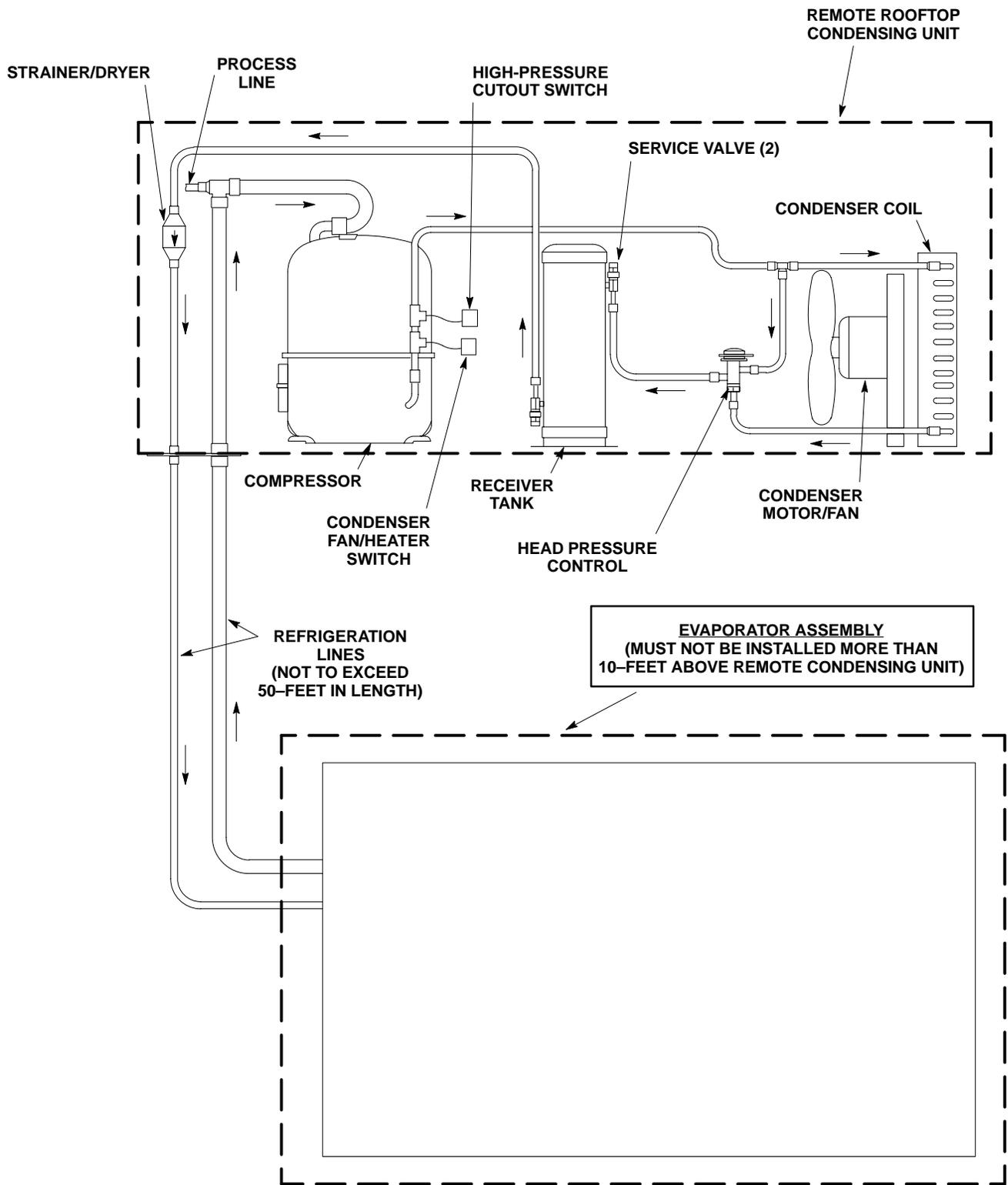


FIGURE 3. REFRIGERATION FLOW DIAGRAM

TROUBLESHOOTING

IMPORTANT: Only qualified personnel should service internal components or electrical wiring.



WARNING: If repairs will be made to Remote Condensing Unit, turn off electrical power to Evaporator Assembly, then disconnect power to Remote Condensing Unit at disconnect switch before proceeding.

Trouble	Probable Cause	Remedy
TROUBLESHOOTING REFRIGERATION COMPRESSOR		
COMPRESSOR COOLS BUT IS VERY NOISY ESPECIALLY WHEN STOPPING AND STARTING	A. Compressor cools, but is very noisy, especially when stopping and starting. This is either a broken suspension spring or loose crank shaft extension.	A. Compressor must be changed.
COMPRESSOR COOLS, BUT IS <i>MODERATELY NOISY</i> , LOUD ENOUGH TO BE NOTICED, BUT NO SHARP BANGS OR CLATTERING	A. Compressor cools but is moderately noisy, loud enough to be somewhat annoying, but no sharp bangs or clattering.	A. This is probably a discharge or suction tube rattling inside the compressor. If noise level can be tolerated, compressor <i>need not</i> be changed. The noise <i>will not</i> affect the performance or shorten compressor life.
COMPRESSOR OPERATES BUT REFRIGERATION SYSTEM DOES NOT COOL	A. Look for a refrigerant leak or oil at tubing joints. If compressor is moderately noisy and no leaks are evident, it is probably a broken valve inside compressor	A. Compressor must be changed.
COMPRESSOR STARTS AND OPERATES FOR A FEW SECONDS, THEN STOPS	A. Compressor running too hot due to condenser coils plugged with dust, lint, and grease restricting cooling air flow through the condenser coil.	A. Clean condenser coil with vacuum cleaner, low-pressure compressed air, or soft brush, then allow compressor to cool and restart.
COMPRESSOR WILL NOT START	A. Check line voltage across “T” terminals on contactor. B. loose or disconnected wires. C. Check control circuit; D. Examine start capacitor for signs of excessive heat (blown up). Check for open by connecting test cord and checking amp draw.	A. Voltage cannot be less than 198 V to start compressor. B. Correct the loose or disconnected wires. C. Contactor must pull in. D. If no current is drawn (or very little), capacitor is open and must be replaced. If capacitor is blown, look for inoperable start relay or low voltage..

Note: If all above checks have been made and compressor will not start, increase start capacitor value by about 15% and try to start. This can be done two ways: (*The substitute capacitor must have voltage rating equal to or greater than the existing start capacitor*) a. Remove existing capacitor and replace with one having a 15% greater MFD rating or (step b). b. Wire capacitor that has 15% of the MFD rating in parallel with the existing capacitor. c. Try to start compressor. If all the previous (steps a and b) will not make compressor operate, label compressor “stuck” and replace.

Trouble	Probable Cause	Remedy
COMPRESSOR STARTS BUT WILL NOT OPERATE FOR MORE THAN A FEW SECONDS	A. Inoperable Start Relay. Note: To check relay, remove wire from No. 1 terminal on start relay and touch to No. 2 terminal. Start compressor and immediately remove wire from No. 2 terminal. If compressor starts and operates, problem is in the start relay.	A. Replace start relay.
	B. Low Voltage. Note: Remove compressor terminals cover and connect voltmeter test leads between "C" (top terminal) and "R" (lower right terminal). Start compressor. A minimum of 198 VAC (nominal) must be present to operate compressor	B. If less than 198 V is present, upgrade Unit power source.
<div style="display: flex; align-items: center;">  <p>WARNING: To avoid electrical shock even after electrical power has been disconnected from Unit, run capacitor must be discharged by momentarily touching both capacitor terminals at the same time using an insulated handled screwdriver.</p> </div>		
	C. Inoperative Run Capacitor.	C. Inspect capacitor for bulges, cracks, or any external deformation. If found, assume capacitor is inoperable and replace. If none of the above conditions are evident, disconnect wires from capacitor. Connect test cord to capacitor terminals. Connect ammeter to one wire of test cord, Plug test cord into electrical outlet and record amp reading. *See formula on next page at end of this trouble topic.

Trouble	Probable Cause	Remedy
COMPRESSOR STARTS BUT WILL NOT OPERATE FOR MORE THAN A FEW SECONDS (CONT'D)	D. Grounded or Shorted Motor Windings.	D. Disconnect all electrical wires from compressor terminals. Set ohmmeter on 100,000 ohm scale. touch one lead to copper line or bare metal of compressor. Touch other lead to each of the compressor terminals in succession. Continuity must not be indicated. If an ohmmeter reading is obtained, then compressor is grounded and must be replaced. To check for shorted windings, set ohmmeter on 10 ohm scale. Attach one lead to "C" (top terminal). The reading should be approximately 1 to 1-1/2 ohms. Leave one lead on "C" terminal and touch other lead to "S" (lower left terminal).The reading should be 3-1/2 to 5 Ohms. Leave one lead on "S" terminal and touch other lead to "R" terminal. This reading should be exactly the sum of the first two readings obtained. If the resistance readings do not fall within these limits, the compressor is "shorted" or has an "open" winding and must be replaced. Replace compressor.

*Use amps reading in formula $\frac{2650 \times \text{Amp}}{\text{volts}/60\text{HZ}} = \text{M.F.D.}$ to determine actual value of capacitor. If calculated actual value is 10% more or less than rated value, replace capacitor.

Trouble	Probable Cause	Remedy
TROUBLESHOOTING REMOTE CONDENSING UNIT		
COMPRESSOR DOES NOT OPERATE.	A. Evaporator Assembly not calling for refrigeration.	A. Refrigeration not called for.
	B. Electrical power to Remote Condensing Unit turned off.	B. Turn on electrical power to Remote Condensing Unit.
	C. Electrical power to Evaporator Assembly turned off.	C. Turn on electrical power to Evaporator Assembly.
	D. No Remote Condensing Unit power source. Blown fuse or tripped circuit breaker.	D. Replace fuse or reset circuit breaker.
	E. Loose, disconnected, or broken wiring.	E. Tighten connections or replace broken wiring
	F. High-pressure cutout switch tripped.	F. High-pressure cutout switch will automatically reset after refrigeration system pressure has lowered (see CAUTION note under CLEANING CONDENSER COIL).
	G. Low voltage.	G. Voltage must be at least 198 V at compressor terminals when compressor is trying to start.
	H. Inoperable run capacitor, or start relay.	H. Replace inoperable part.
	I. Inoperable compressor.	I. Replace compressor.
COMPRESSOR OPERATES CONTINUOUSLY BUT DOES NOT COOL SUFFICIENTLY	A. Refrigeration capacity is exceeded by product overdrawing.	A. Reduce amount of product drawn per given time.
	B. Air circulation through Remote Condensing Unit condenser coil is restricted.	B. Check and if necessary, clean condenser coil as instructed.
	C. Insufficient refrigerant charge.	C. Find and repair refrigeration leak, then replenish refrigerant charge.
CONDENSER FAN MOTOR NOT OPERATING.	A. Fan blade obstructed	A. Remove obstruction.
	B. Inoperative condenser fan motor.	B. Replace condenser fan motor.
	C. Compressor contactor inoperative.	C. Replace compressor contactor.
	D. Disconnected or broken electrical wire.	D. Connect or repair broken electrical wire.

PARTS LIST

UNIT PART NUMBERS:

416117-0001

496117-0001

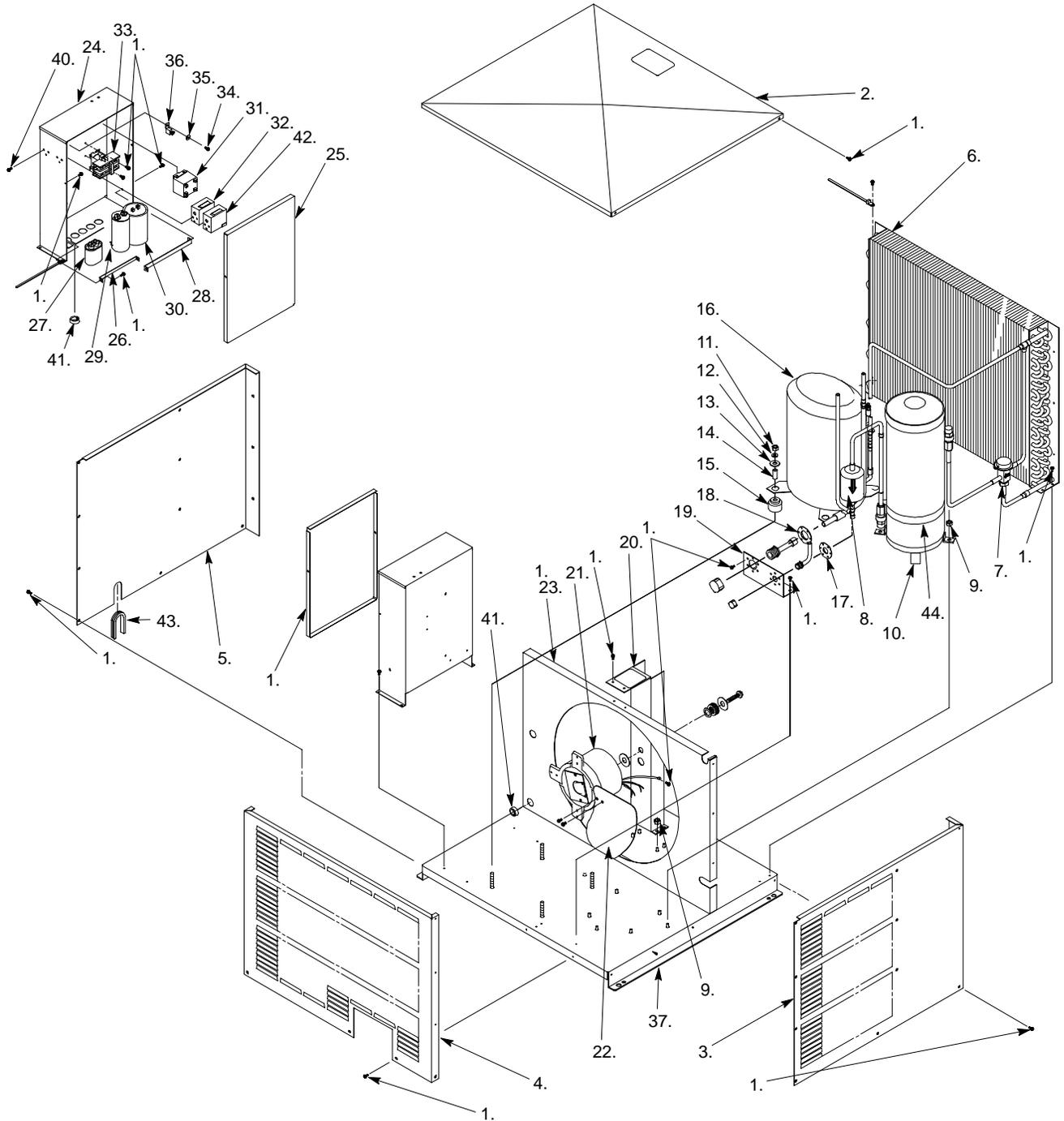


FIGURE 5. REMOTE CONDENSER ASS'Y

REMOTE CONDENSER ASS'Y (CON'T)

Item	Part No.	Description
	4161170001	Remote Condenser Ass'y, 230V 60HZ
	4961170001	Remote Condenser Ass'y, 230V 50HZ
1.	*319941000	Thread Rolling Screw, SL Hex Washer HD. No. 8-32 By 3/8 in. Long
2.	324153068	Cover, Remote Condenser
3.	324151068	Panel, Right-Side
4.	324152068	Panel, Back
5.	324150068	Panel, Left-Side
6.	324148000	Condenser Coil
7.	309215000	Pressure Control
8.	3557	Dryer
9.	*189429000	Hex Nut, 1/4-20
10.	5041	Receiver
11.	*186146000	Hex Nut, 5/16-18
12.	*186148000	Washer, Lock, .319 I.D.
13.	318418000	Washer .312 I.D.
14.	3609	Spacer
15.	3608	Grommet
16.	3726	Compressor, 230V 60HZ
	3725	Compressor, 230V 50HZ
17.	309919000	Flange, 3/8
18.	309920000	Flange, 1/2
19.	309895011	Bracket, Coupler
20.	324155000	Bracket, Motor
21.	2893	Motor, 1/6 H.P., 230V. 60HZ
	2115	Motor, 1/6 H.P., 230V. 50HZ
22.	324145000	Blade, Fan
23.	324154000	Shroud
24.	4999	Control Box
25.	324156000	Cover, Control Box
26.	324172000	Strap, Capacitor Fan
27.	324143000	Capacitor, Start, Fan
28.	325956000	Strap, Capacitor

REMOTE CONDENSER ASS'Y (CON'T)

29.	325518000 3617	Capacitor, Run, 230V 60HZ Capacitor, Run, 230V 50HZ
30.	40284000	Capacitor, Start
31.	40285	Relay, Start
32.	324209000	Pressure Switch, HI, 200 PSI
33.	329473000	Contactora, 24V.
34.	*325069000	Machine Screw, S: Hex HD, No. 10-24 by 1/2-in. Long
35.	325145000	Washer, #10
36.	325644000	Lug
37.	5042	Base
38.	*187552000	Machine Screw, Phil RD HD, No. 8-32 by 1/4-in. Long (Not Shown)
39.	309524011	Cord (Not Shown)
40.	320734000	Self-Threaded Screw, Phil Pan HD. No. 6-32 by 3/8-in. Long
41.	313802000	Snap Bushing
42.	324208000	Pressure Switch, HI, 405 PSIG
43.	960194000	Edging, Grommet
44.	324215000	Heater, 138 Watt, 220V. 60Hz

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